Meeting Notes: Community Advisory Group - Aerojet Superfund Issues, January 17, 2006

1. Attendees

Charles Berrey (USEPA, Aerojet RPM), Alex MacDonald (Regional Water Quality Control Board), Jackie Lane (EPA), Tricia Carter (Recorder, CH2M HILL), Paul Schubert (GSWC), Janis Heple, Vicki Lee, Mike Cataldo (Schnitzer Steel), Paul Harris (GSWC), Jean Young (SCWA), Larry Ladd, Mike Nisenboym (Fair Oaks Water District), Julie Friedman (EM Assist), Rodney Fricke (Aerojet)

2. Approval of Meeting Minutes

The meeting minutes were accepted as final along with a minor correction from Jean Young (SCWA).

3. Update on Well Installation Activities in OU-3 and Beyond, Alex MacDonald, RWQCB

Several monitor wells and extraction wells have been installed.

Area 4 - Last week, one monitor well cluster was installed in Area 4 on the Carmichael Water District Treatment Plant property. The well was placed to help define the plume in the area to provide information for installation of the extraction well near the monitor well. The monitor well will also provide information to allow determination of aquifer parameters when testing the extraction well.

Area 3 - A clustered monitor well (three completions in Layers A, C, and D) was installed in Federspiel Park. Concentrations of perchlorate were detected at 7, 10, and 31 ppb, respectively. An extraction well near the clustered monitor well has been constructed and is screened in Layer C. A monitor well already exists in Zone B.

Zone 3 (GET B) – Additional monitor wells and extraction wells will be installed in this area to control the plume before reaching the Tiechert facility. Currently muddy conditions have prevented installation. Extraction wells have been completed to address the White Rock Dump plume.

Matherfield – Another monitor well will be installed within the next month on the south side of the runway to locate the tip of the plume and identify where to locate another extraction well, or if another extraction well is needed.

4. Update on major milestones and deliverables produced since the May meeting for OU3 and other environmental related efforts at Aerojet, Charles Berrey, EPA

Charles updated the CAG on recent OU-3 activities/deliverables. Since the last meeting, the following has been completed:

1. Agencies requested within 21 day, Aerojet incorporate Agencies' comments on Aerojet's 10/31/05 Response to Comments, NDMA Reformation, Area 2 Treatment System. Aerojet to resubmit week of 1/23/06.

   Charles noted that there had been some difficulty in treating the groundwater to 1.3 ppt. currently trying to get down to 2 ppt.

2. EPA sent letter to California American Water Co. requesting by 12/16 any comments on Pumping Test Work Plan for Chettenham, by 12/23 review, comment on 90% Aerojet wellhead treatment design, and work with Golden State and Sacramento County Department of Water Resources to field verify inter-tie capacity.

Larry Ladd expressed his concern about the approval and use of the wellhead treatment systems and the lack of public sharing of information/data. Paul Schubert noted that there will be a public meeting and that the data will be made available to the public.

3. Agencies disapproved Aerojet's technical Memo, Area 1 Early Effectiveness Assessment, OU3 and requested resubmission in 21 days. Aerojet resubmitted revised document 1/13/06 and Agencies reviewing.

4. Agencies commented on Draft Chettenham Well Pumping Test Work Plan submitted by Aerojet 11/18/05 and requested next submission within 21 days. Aerojet submitted revised document 1/13/06 and Agencies reviewing.

5. Agencies granted Aerojet's 12/09/05 request for an extension to the Area 1 Final Design until March 31, 2006 based on Aerojet proceeding simultaneously with 1) gather field data to support the computer model and 2) evaluate upgradient extraction in the area of monitor well 3592.

   Charles noted that this is an effort to preserve the layer D aquifer and to accelerate the remedy.

6. Agencies commented on Aerojet's 11/28/05 Design Submittal for Area 3-Well C7 Expansion (from 200 to 500 gpm). Comments overtaken by Aerojet's decision to change long-term treatment at C7 from wellhead to central plant treatment due to pipeline routing change.

   Charles noted that the ion exchange system would therefore not be expanded.

Charles summarized other Aerojet Environmental Efforts:

7. Agencies responded to Aerojet's Response to EPA's Comments on Background Metals Work Plan. Agencies are in agreement with overall approach.

8. Agencies commented on Low-Flow/Micro-Purge Well Sampling Standard Operating Procedure.

9. Agencies commented on Draft Program Plan Modification Report update (potential source areas 31E, 39E, and 44D be included in the Island Operable Unit).

10. Agencies provided comment on Aerojet's 1/25/05 Priority Evaluation – Central OU Potential Source Areas recommending potential source Area 44D be placed in the Island OU. Aerojet requested to respond within 30 day.

11. Agencies accept Aerojet's 11/02/05 Revised Summary of Review of Volatile Halogenated Organics by EPA 601.

12. Agencies provided comments on Aerojet's 11/21/05 Response to Agency Comments on Transmittal of Preliminary Risk Assessment Figures for Perimeter Operable Unit. Aerojet agreed to implement comments 1/11/06.

13. Agencies commented on Aerojet's 11/21/05 Response to DTSC and Supplemental EPA Comments on Field Sampling Plan for the Validation of the Johnson & Ettinger Model providing guidance for statistical data validation. Conference call was held 1/20/06 in which Aerojet proposed Monte Carlo simulation for confidence bounds of modeling results. Results to be presented at 1/25/06 monthly Technical Meeting and report submitted 2/8/06 vs. the original schedule of 1/15/06.

14. In response to Aerojet's 12/02/05 Transmittal of Evaluation of the Occurrence and Detection of 1,3-Butadiene in Soil Vapor at the Aerojet Superfund Site, Agencies requested within 90 day Aerojet revise the Standard Operating Procedure to prevent field sampling contamination and to continue to sample for 1,3-Butadiene in Remedial Investigation work.

15. Agencies requested comments be incorporated in Aerojet's 11/21/05 Response to Comments and Revised Standard Operating Procedures for the Aerojet Site within 60 days (disposal off-site drilling and sample development non-source areas).

16. Agencies requested Aerojet incorporate comments on Aerojet's December 21, 2005 Material Modification Proposals Groundwater Extraction and Treatment AR in Zone 1, A in Zone 4 and B in Zone 3. Detail provided in separate presentation.

    Charles noted that some of the modifications to the GET system could be conducted under the partial consent decree.

17. EPA send Aerojet split sampling results for volatile organic sampling by EPA's Richmond Lab taken 10/19/05. Aerojet used Sequoia Analytical for sample analysis. Comparison of split samples within acceptable limits.

Charles also reviewed the Aerojet Partial Consent Decree (PCD) material modifications to Groundwater Extraction and Treatment (GET) AR, A and B Systems. Four figures were reviewed detailing 1) Extraction Wells (EWs) added under PCD Zones 1, 3, & 4 to expedite Operable Unit 5 (OU5) toe of plume control, 2) Zone 1 – EWs Z1-C1, & D1; Z1-C2 & D2, & Z1-C3 (1,550 gpm) to GET AR plus CL04 design, 3) Zone 3 – EWs Z3-C1 & D1; Z3-C2 & D2; Z3-C3 & D3; Z3-E3 & F3; & increase flow 4570 (1,390 gpm) to Get B, and 4) Zone 4 – EWs Z4-A1 through A6 & Z4-B1 (430 gpm) & add capacity at Get A.

Larry noted that the closest monitor well is east of Hazel and that there is limited monitoring data in this area. Alex agreed that there may be limited data, but noted that groundwater flow directions from Aerojet are to the west-northwest and not towards the area Larry expressed concern about.

5. Deep Injection Well Closure and Post Closure – Rodney Fricke, Aerojet

Rodney presented on the history of the injection wells (regulatory and operations), the well injectate migration assessment (condition of injection wells and downgradient hydrogeology), the closure program (well destruction and notifications), and post-closure program (long-term monitoring and results of monitoring).

Rodney summarized the regulatory history from 1962 to June 2004:

- January 1962 (DOG) – Approved design of IW-1 to protect fresh groundwater above 965 feet.
- January 1962 (RWPCB) – Groundwater deeper than 1,000 feet suitable for waste disposal.
- March 1974 (RWQCB) – Order No. 74-251 for IW-1 limited waste disposal to depths greater than 900 feet and established monitoring requirements.
- February 1976 (RWQCB) – Order No. 76-12 for IW-2 limited disposal to depths greater than 1,000 feet and established monitoring requirements.

Note: Both orders state the following: 1.) satisfactory history of operation and no water quality problems, 2.) base of fresh water between 435 and 490 feet, respectively, and 3.) Injection zone capped by 460 and 500 feet of relatively impermeable clay and silt.

- June 1984 (US EPA) – Underground injection control (UIC) program became effective.
- May 1985 (Aerojet) – Submitted application for UIC permit.

- September 1985 (EPA) – Denied permit. Operation of wells terminated.
- October 1985 (DHS) – Toxic Injection Well Control Act effective.
- October 1989 (Aerojet) – Proposed investigation of injectate migration.
- December 1989 (EPA/DHS) – Proposed separate consent orders for investigation and closure of IW-1 and IW-2.
- August 1990 (EPA/DHS) – Consent orders became effective.
- September 1990 (Aerojet) – Submitted workplan for Well Injectate Migration Assessment (WIMA).
- February 1991 (EPA/DHS) – Approved Workplan.
- March 1992 (Aerojet) – Submitted WIMA report.
- April 1992 (Aerojet) – Submitted Closure/Post-Closure Plan.
- January 1993 (Aerojet) – Submitted revised Closure/Post-Closure Plan according to DTSC comments.
- June 1993 (DTSC) – Approved Plan for public comment.
- January 1994 (Aerojet) – Submitted revised Closure/Post-Closure Plan according to DTSC comments.
- April 1994 (DTSC) – Released revised Closure/Post-Closure Plan for public comment.
- June 1994 (DTSC) – Approved revised Closure/Post-Closure Plan.
- October 1998 (EPA) – Terminated consent order at Aerojet's request after completion of closure.
- May 2000 (DTSC) – Terminated consent order at Aerojet's request.
- June 2004 (DTSC) – Incorporated Post-Closure Plan into Aerojet RCRA Permit.

Well construction for IW-1 and IW-2 occurred in 1962 and 1975, respectively. IW-1 was perforated from 970 to 1,400 feet and IW-2 was perforated 976 – 1,604 feet. IW-1 operated for 17 years (1963 to 1968 and 1975 to 1985). IW-2 operated for 8 years (1978 to 1985). IW-1 received 73 million gallons of injectate and IW-2 received 12 million gallons of injectate. In total, 85 million gallons of injectate were injected at an average rate of 40 gallons per minute. Well destruction occurred in October 1994. Injectate consisted of sulfates (59%), chlorides (16%), nitrates (10%), other inorganics (4%), 1,2-DCA (3%), other organics (7%), and a few unknowns (1%).

The well injectate migration assessment included mechanical integrity testing of the wells, chemical analysis of injectate in the wells, and construction of 11 monitor well completions at 4 locations for hydrogeological evaluation. Findings at the wells concluded that integrity testing did not identify any migration pathways, there was a high total dissolved solids (TDS) hit in the injectate sample for IW-1 (sodium sulfate, organics), and the IW-2 sample was for deep groundwater with injectate constituents. Findings of the hydrogeological evaluation confirmed that injectate had not impacted the Valley Spring Formation, injectate was not identified in the downgradient Ione Formation, a 30-foot clay confining layer between Valley Spring and Ione Formations, groundwater flow is southwesterly (much slower than fresh groundwater), and injectate migration is slow and to the west due to the slope of rock layers (approximately 35 feet per year).

The Closure Program involved the destruction of the injection wells in October 1994. Activities included three separate plugs of cement pumped into each well, shot perforation of casing, demolition of well heads, and a closure report. Notification Requirements included the State of California (Department of Water Resources and Department of Oil and Gas) and Sacramento County (Recorded: Declaration of Covenants, Conditions, and Restriction), Environmental Management, Planning and Community Development, and Environmental Review and Assessment).

The Post-Closure Program involves long-term monitoring of the wells for 40 years, an annual report and periodic notifications, and the installation of two additional well completions at a fifth location.

Rodney recapped his presentation and highlighted the key notes by stating that 1) the injection zone is isolated from municipal supply wells by a 30-foot clay confining layer and 500+ feet of low permeability Valley Springs Formation, 2) injectate has not impacted the base of the Valley Springs Formation, 3) injectate has arrived at the first downgradient monitor well, 4) injectate migration is approximately 1,400 feet in 40 years (35 feet/year), and 5) monitoring and DTSC oversight will continue through 2034.

6. Next Meeting.

Next meeting: Tuesday, March 21, 2006, Sheriff's substation, Conference Room, 10361 Rockingham Way (just off Mather), Rancho Cordova, 7 p.m. to 9 p.m.